

**REMARKS**

Claims 1, 3 - 22 and 24 - 28 are pending in this patent application, of which claims 8 and 25 have been amended. Claims 2 and 23 have been canceled without prejudice or disclaimer. No new matter has been added.

The applicant thanks the Examiner for allowing claims 1, 3 - 7, 13, 15, 20, 22 and 26.

As to the remaining claims, first, claims 8, 9, 23, 27 and 28 stand rejected under 35 U.S.C. §103(a) as unpatentable over U.S. Patent 7,002,733 to Dagenais et al. (hereafter, "**Dagenais et al.**").

Applicant respectfully traverses this rejection.

As noted in Applicant's previous response filed February 15, 2007, **Dagenais et al.** discloses an optical amplification device including a depolarizer for reducing the polarization sensitivity requirements on a semiconductor optical amplifier ("SOA") by changing the input to the SOA from having an arbitrary (unknown) polarization state to a known (depolarized) state. The depolarizer receives an input optical signal and outputs a depolarized optical signal, and an SOA receives the depolarized optical signal and outputs an amplified optical signal.

FIG. 6 of Dagenais et al. shows two separate SOAs, in contrast to the present invention, in which a single SOA with two separate inputs and outputs is used.

In FIG. 6 of Dagenais et al., each SOA amplifier amplifies a TE wave and, after amplification, the output of one of the SOAs is converted to a TM wave to be combined with the other amplified TE wave in polarization beam combiner 67. Column 5, lines 65-67 disclose the reason for using this configuration:

This configuration uses the two polarization dependent SOAs in an offsetting manner to create a polarization insensitive amplification device 60.

Thus, it would not have been obvious to one of ordinary skill in the art to remove polarization rotator 66 to couple two separate TE waves in a multiplexer prior to amplification. In FIG. 6 of Dagenais et al., polarization beam combiner 67 combines different types of light polarizations after amplification by SOA 62 and SOA 63, while the single SOA recited in claim 8 of the instant application performs light amplification without sending its output to any such “polarization beam combiner.”

**Dagenais et al.** also fails to disclose the phase controller recited in claim 9 of the instant application, which controls “a phase of the TE wave outputted from said demultiplexer so that the TE wave intensifies with a TE wave outputted from said converter in said multiplexer.”

**Dagenais et al.** further fails to disclose a gain equalizer for controlling a gain of a light outputted from said semiconductor optical amplifier within a range within a predetermined wavelength band.

On page 3 of the Office Action, the Examiner has asserted that a gain equalizer is not claimed.

Applicant respectfully disagrees. Claim 23, depending from claim 8, recites a “gain equalizer for controlling a gain of a light outputted from said semiconductor optical amplifier within a range of a predetermined wavelength band.” On page 7 of the Office Action, the Examiner urges that “all gain equalizers and amplifiers inherently work in a limited range....” This assertion is not relevant to the failure of **Dagenais et al.** to disclose any gain equalizer.

Accordingly, claim 23 has been canceled and its limitations have been added to claim 8.

Thus, the withdrawal of the 35 U.S.C. § 103(a) rejection is in order, and should be withdrawn.

Second, claims 12 and 17 stand rejected under 35 U.S.C. § 103(a) as unpatentable over **Dagenais et al.** in view of **Uchizaki et al.** and further in view of **Kinoshita et al.** (also previously applied). Applicant respectfully traverses this rejection.

**Kinoshita et al.** has been cited for teaching an ALC support structure but, like the other cited references, fails to teach, mention or suggest at least the gain equalizer as recited in claim 8, from which these claims depend.

Accordingly, the withdrawal of the outstanding rejection under 35 U.S.C. § 103(a) as unpatentable over **Dagenais et al.** in view of **Uchizaki et al.** and further in view of **Kinoshita et al.** is in order, and is therefore respectfully solicited.

Lastly, claims 10, 11, 14, 18, 19, 21, 24 and 25 stand rejected under 35 U.S.C. § 103(a) as unpatentable over **Dagenais et al.** in view of **Uchizaki et al.** and **Kim et al.** Applicant respectfully traverses this rejection.

First, claim 18 depends from claim 7, which has been allowed, so claim 18 is also allowable.

**Kim et al.** discloses a polarization insensitive semiconductor optical amplifier (SOA) in an optical amplifying element having a substrate and a multi-layer structure, crystal growth layer including an active layer formed on the substrate. The active layer is divided into first and second areas having different polarization modes. An electrode means independently applies currents to the first and second areas. Therefore, the polarization insensitive semiconductor optical amplifier is capable of separately controlling TE and TM polarization gains so as to approximately equalize the TE polarization gain to the TM polarization gain.

Although FIG. 2 of **Kim et al.** shows a TM area and a TE area, there is only one light input and only one light output path in single active layer 30.

This is in contrast to the present invention as shown in FIG. 1, in which there are two separate light inputs and two separate light outputs. This is because it has two of the structures shown in FIG. 2, as disclosed from page 7, line 27 to page 8, line 9 of the specification of the instant application. FIG. 1 shows two light inputs and two light outputs for the quantum dot optical amplifier 1 of the instant application.

The Examiner has urged that Kim et al. teaches the optical repeater wherein said demultiplexer and said multiplexer are monolithically integrated into a PLC with said semiconductor optical amplifier.

As noted above, Kim et al. fails to disclose either the converter or the gain equalizer recited in claim 8, amended as proposed, from which claims 10-11, 14, 16, 19 and 21 depend.

Thus, the withdrawal of the outstanding obviousness rejection under 35 U.S.C. §103(a) based on Dagenais et al. in view of Uchizaki et al. and Kim et al. is in order, and is therefore respectfully solicited.

In view of the aforementioned amendments and accompanying remarks, the claims, as amended, are in condition for allowance, which action, at an early date, is requested.

If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact Applicant's undersigned attorney at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

U.S. Patent Application Serial No. **10/716,662**  
Response to Office Action dated May 23, 2007

In the event that this paper is not timely filed, Applicant respectfully petitions for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,

KRATZ, QUINTOS & HANSON, LLP



Mel R. Quintos  
Attorney for Applicant  
Reg. No. 31,898

MRQ/ak/ipc

Atty. Docket No. **031281**  
Suite 400  
1420 K Street, N.W.  
Washington, D.C. 20005  
(202) 659-2930



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Enclosure: Petition for Extension of Time